Table 2. Summary of Species Composition* of Fishes on Sportfish Boats in Vicinity of the ARCO PRC-421 Project Area**

Common Name	Species Name	Ellwood	Naples Reef	Average
Kelp bass†	*Paralabrax clathratus*	1919††	4056	2988
Barred sand bass†	*Paralabrax nebulifer*	81	100	91
Pacific mackerel	*Scomber japonicus*	375	25	200
Pacific bonito	*Sarda chiliensis*	0	6	3
Kelp rockfish	*Sebastes atrovirens*	144	56	100
Brown rockfish	*Sebastes auriculatus*	13	0	6
Gopher rockfish	*Sebastes carnatus*	44	6	25
Copper rockfish	*Sebastes caurinus*	19	6	13
Black-and-yellow rockfish	*Sebastes chrysomelas*	50	6	28
Grass rockfish	*Sebastes rastrelliger*	31	13	22
Olive rockfish	*Sebastes serranoides*	0	19	9
Treefish	*Sebastes serriceps*	0	6	3
Cabezon	*Scorpaenichthys marmoratus*	13	63	38
California sheephead†	*Semicossyphus pulcher*	38	6	22
Lingcod	*Ophiodon elongatus*	31	63	47
California barracuda†	*Sphyraena argentea*	13	69	41
California halibut†	*Paralichthys californicus*	188	6	97
Total of Managed Species		719	263	491
Total		2956	4506	3731

* Species limited to managed species or species important in sport catch in nearshore waters off southern California

** Based on sport catch data provided by Dave Ono, CDF&G (Ono 2000)

† Not managed species regulated by NMFS.

†† Numbers are averages for estimates of total catches for years 1986 through 1989.

The videotapes recorded by Oceaneering International were reviewed to obtain insight into the fish and invertebrates living on the structures and near the project area. Very few fish were observed, even during surveys when water clarity exceeded 10 feet. In view of the usual abundance of fish around underwater structures and kelp beds (personal observation), it is likely that the fish were avoiding the area during the survey periods due to the unusual activity and frequent disturbances (e.g., hammering on the structures by the divers to determine structural integrity, as observed in the video records).

Shane Anderson, Diving Officer at UCSB, indicates that the structures provide good habitat for fish and that the abundance and species diversity of fishes around the structures is greater than on the surrounding low-relief reefs or on the sand bottom. He mentioned the following species: cabezon, lingcod, rubberlip and rainbow surfperch, black perch, kelp and sand bass, and female sheephead. He postulated that these species are more abundant around the pier because of the mussel beds. He reported that kelp, black-and-yellow, and gopher rockfish are common in the natural kelp habitats in this area. He indicated that lingcod nest in the structures.

Algae

The giant kelp (*Macrocystis pyrifera*), an important algal resource in southern and Central California, occurs in the area and on some of the structures that will be removed. Other common algae include the kelps *Pterygophora californica* and *Cystoseira osmundacea*. None of these species are managed by NMFS but giant kelp creates a habitat that is essential in the life history of many species of fish, including managed species. Thick kelp was shown to be widespread north of the pier at depths of less than about 20 feet below MLLW (Plate 1 in Fugro (1999), which summarizes the results of the March 1999 side scan sonar survey). Scattered kelp was observed during a review of the videotapes recorded by OI during its April and May 1999 survey of the structures to be removed. Dense kelp was observed in these same tapes on the rock pile that lies inshore of the pier. However, the quantity of giant kelp on all of the structures except the rock pile appeared to be small and loss of those structures supporting kelp should not create a significant reduction in kelp biomass.

Invertebrates

Market squid (*Loligo opalescens*), the only species managed by the west coast NMFS management councils, do not appear to live in this area.

Analysis of Effects

"Essential Fish Habitat" is defined as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". "Waters", as used in this definition, are defined to include "aquatic areas and their associated physical, chemical, and

biological properties that are used by fish". These may include "...areas historically used by fish where appropriate; 'substrate' to include sediment, hard bottom, structures underlying the waters, and associated biological communities". "Necessary" means "the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem". Essential Fish Habitat is described as a subset of all habitats occupied by a species (Helvey and Naughton 1998). However, in a discussion with Robert Hoffman (NMFS) regarding an operational definition of Essential Fish Habitat, he indicated that, at this time, NMFS considers all waters and habitat between the high tide line and the 200-mile limit are considered EFH for purposes of this assessment. He elaborated that the concept of EFH being a subset of the overall habitat occupied by fish will remain unfeasible until sufficient data are available to allow a clearer distinction between essential and non-essential habitat.

Impacts

Several types of impacts to fisheries resources and Essential Fish Habitat could result from activities or changes in habitat availability related to the project. These impacts can be segregated into site-specific and cumulative or regional impacts and into temporary or permanent impacts. Potential impacts to natural hard bottom from anchoring activities have been addressed by the anchoring plans presented in the Anchor Mitigation and Hard Bottom Avoidance Plan and should be minimal.

Site-specific Impacts

Jetting and airlifting to remove sediment around pier columns and pilings –Both sediment removal and the associated silt plumes would be temporary and impacts would be minor. Animals and plants near the areas of sediment removal could be smothered or buried. These areas will be buried under quarry rock later in the program and so loss will be permanent.

Collapse of pier structure during demolition – This impact would be permanent but very localized. Primarily only organisms such as mussels that live on the pier structure would be affected but sedentary and some mobile animals living within the boundaries of the structure will be affected.

Shock waves associated with explosive blasts used to sever columns and pilings – This impact would be temporary and, because the charges would be placed below the mudline, relatively localized.

Loss of hard substrate associated with pier and submerged pilings – This minor loss of substrate would be permanent but compensated for by the rock pile constructed to bury the columns. The greatest ecological impacts would involve the loss of mussels living intertidally on the columns. However, a major conclusion of structural analyses by Thomas and Beers (1999) and Oceaneering International (1999) was that the columns

supporting the remnants of the pier will collapse from natural causes in the near future. Consequently, the intertidal mussel populations will be lost in any event.

Shock waves associated with pile driving of four new pipe piles– This impact would be temporary and localized. Fish immigrating to recolonize the area occupied by the toppled columns will be able to move a safe distance away when the pile-driving activities begin.

Cumulative or Regional Impacts

Increased rock habitat in new rock pile – This increase in hard substrate would be permanent. On a regional basis, this would result in a minor increase in habitat for kelp that is used for cover, forage, and nursery areas by several fish species, some of which are managed. The imported rock pile would increase available hard bottom habitat by approximately 0.7 acres (0.3 hectares), about 6% of the estimated hard bottom mapped by Fugro on PRC-421.

Loss of soft habitat under the new rock pile – This loss of substrate would be permanent. On a regional basis, this would result in a minor loss of habitat that is used for forage by several fish species, some of which are managed. The imported rock pile would decrease available soft-bottom habitat by approximately 0.7 acres (0.3 hectares), a very small fraction of the soft bottom mapped by Fugro in PRC-421.

Significance of Impacts on Essential Fish Habitat

Based on the definitions above, as currently interpreted by the National Marine Fisheries Service, and the nature and geographic distribution of the fish species that are likely to occur in this area, this project does not appear to constitute a significant loss of Essential Fish Habitat for any of the species managed by NMFS. Overall, the structures that would be removed by the project are artificial and not normally used by any of the managed species as EFH. Removal activities that might impinge on EFH would be temporary. Moreover, as pointed out above, Thomas and Beers (1999) and Oceaneering International (1999) have indicated that the columns supporting the remnants of the pier will collapse from natural causes in the near future, substantially reducing the amount of artificial habitat available for fish and invertebrates.

In addition, the creation of new rock habitat in the area to bury the toppled columns could probably be considered an increase in EFH since this structure will probably increase species diversity and fish biomass in the area and create added spawning and nursery areas for managed groundfish species such as rockfish, cabezon, and California scorpionfish.

Proposed Mitigation

Table 3. Summary of Potential Impacts from the Proposed Removal Activities

Potential Source of Impact	Species Affected	Proposed Mitigation
Excavation of sediment around pier columns	Juvenile and adult flatfish and nearshore taxa of rockfish	The amount of jetting and/or airlifting of sediments will be the minimum required to allow placing explosive charges around the concrete columns and to expose pilings and conductors to allow torch cutting in compliance with California State Lands Commission requirements. Nearby rocky habitat is expected to support fish that will likely vacate the immediate area during construction activities, as apparently occurred during the OI diving surveys to evaluate structural integrity.
Collapse of pier structure during demolition	Resident fish	Mobile fish will likely vacate the structure as a consequence of the intense construction activities preceding demolition. Even in the absence of the proposed pier removal project, collapse of the pier columns is imminent during a moderate to severe storm or earthquake based on a 1999 structural evaluation. A storm- or earthquake-induced would result in similar impacts to resident fish and invertebrates.
Shock waves associated with explosive blasts used to sever columns and pilings	Species of fish with swim bladders	The project has been designed to use relatively small (7.2 lbs. TNT eqv. per column) explosive charges placed below the mudline to minimize shock waves. Nearby sandy and rocky substrates are expected to support fish that will likely vacate the immediate area during construction activities, as apparently occurred during the OI diving surveys.

Anchor damage to nearby hard bottom habitats	Several species of rockfish, cabezon, California scorpionfish, lingcod	Protection of hard bottom habitat has been designed into the project through the Anchor Mitigation and Hard Bottom Avoidance Plan. An agency-approved anchor plan will be utilized and rock habitats will be avoided to the extent possible. Mitigation measures to be employed include: • Mapping hard bottom and kelp to identify avoidance areas. This has been performed for the project area. Additional diver surveys will be performed in anchoring areas where existing mapping is incomplete. • Placement of vessel anchors to avoid surveyed areas of hard bottom. Anchors will be set in precise predetermined locations using a DGPS positioning system. • Placing anchors for the load line barge using a separate anchor handling boat, rather than the barge itself. • Moving the load line barge by the winching the barge against set anchors. This approach could potentially damage kelp plants along the inshore anchor corridors if kelp beds are well developed during the construction period. Nearby rocky habitat is expected to support fish and motile invertebrates that will likely vacate the immediate area during construction activities, as apparently occurred during the OI diving surveys.
Loss of hard substrate associated with pier and submerged pilings	Several species of rockfish, cabezon, California scorpionfish, lingcod	Removal of this artificial habitat is mandated by California State Lands Commission requirements covering abandonment of lease PRC-421. The presence of this temporary habitat was an

		unintended, incidental benefit of the pier structure during its lifetime. Larger numbers of fish and invertebrates will commence colonizing the new quarry rock structure immediately following completion of construction activities. This new structure will increase species diversity and fish biomass in the long term.
Loss of soft habitat under the new rock pile	Several species of flatfish	Fish and motile invertebrates will likely vacate the immediate area during construction activities, as apparently occurred during the OI diving surveys and attempt to relocate to natural hard bottom in the vicinity. Larger numbers of fish and invertebrates will commence colonizing the new quarry rock structure immediately following completion of construction activities. This new structure will increase species diversity and fish biomass in the long term.

Analysis of Alternatives

Option 1: Take no action.

Removal of the columns, pilings, imported rock, and sea floor debris is mandated by the lease requirements of the California State Lands Commission. The No Action alternative would result in either a catastrophic failure or continued degradation of the columns. In either case, threats to public safety would remain, and environmental impacts would likely be greater than during a planned, systematic removal operation.

Option 2: Partially remove some precariously hanging topside members.

Option 2 would reduce some of the risk to the public. Removal of marine growth on the columns would be required to lower potential stress factors on the columns. While this option could moderately reduce the risk to public safety, it would still result in a catastrophic failure of the structure over time.

Option 3: Completely remove topside structure.

Option 3 would further reduce the risk to public safety. However, as in Option 2, the columns would be left to degrade and ultimately fail. This option would result in the highest environmental impacts due to the two equipment mobilizations required to perform the topside removal and, ultimately, the column removal after a catastrophic failure.

Option 4. Completely remove topside structure and supporting columns

Option 4 removes both the topside structure, which poses the immediate public hazard, and the supporting reinforced concrete column structures, which are in a serious state of deterioration. This option will result in the least environmental impact, immediate elimination of public hazard while allowing an execution method, which is safe for personnel.

Option 5: Upgrade facility

Upgrading the facility for long-term utility was found to be unfeasible due to the need to remove virtually all of the topside structure and column grout in order to determine the suitability of re-using any of the steel column-support beams. Results of the structural analysis, contained within this submittal, support this position.

Option 6: Completely remove topside structure, topple supporting columns in place and provide mitigation for loss of Brown Pelican roosting habitat

Removal of the topsides structure, which poses immediate public hazard and toppling the concrete column structures, which are in a serious state of deterioration, installation of a new emergent structures consisting of pile-supported roosting platforms to provide Brown Pelican roosting habitat, and covering the toppled columns with quarry rock. This option results in immediate elimination of public hazard, reduced number of anchor points vs. Option 4, reduction in environmental impacts by providing bird roosting habitat and provides environmental benefits by creating new hard-bottom habitat while allowing an execution method that is safe for personnel.

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